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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,975	12/07/2006	Vesa Myllymaki	0696-0229PUS1	2874

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EXAMINER
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BLAND, LAYLA D

ART UNIT	PAPER NUMBER
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1623

NOTIFICATION DATE	DELIVERY MODE
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06/17/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/566,975	<b>Applicant(s)</b> MYLLYMAKI ET AL.	
	<b>Examiner</b> LAYLA BLAND	<b>Art Unit</b> 1623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/19/2008</u> .   | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

This office action is a response to Applicant's amendment submitted April 15, 2008, wherein claims 5, 6, and 11 are amended and new claims 13 and 14 are added.

In view of Applicant's remarks submitted April 15, 2008, the rejection of claim 5 under 35 USC 112, second paragraph, for being indefinite with regard to the number of carbons in alkoxyalkyl groups, is withdrawn. Applicant states that the C2-C6 limitation is intended to define the total number of carbon atoms in the alkoxyalkyl group.

In view of Applicant's amendment submitted April 15, 2008, the rejection of claim 5 under 35 USC 112, second paragraph, for being indefinite with regard "pseudohalogen" is withdrawn.

In view of Applicant's amendment submitted April 15, 2008, the rejection of claims 6 and 11 under 35 USC 112, second paragraph, for being indefinitely with regard to "preferably" is withdrawn.

In view of Applicant's remarks submitted April 15, 2008, the rejection of claims 8-10 under 35 USC 112, second paragraph, for being indefinite with regard "non-solvent" is withdrawn. Applicant's argument is persuasive.

The following rejections are maintained and modified to include new claims 13 and 14.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11, 12, and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 11, 12, and 14 recite the limitation “carboxylic acid or a reactive derivative thereof.” It is unclear which modifications of carboxylic acids are intended to be encompassed by “reactive derivatives,” thus, it is impossible to determine the metes and bounds of the claims.

***Response to Arguments***

Applicant argues that the above language would be well understood by one of ordinary skill in the art, and that the limitation is defined on page 11, line 23 to page 12, line 3 of the specification. A review of the recited pages of the specification did not reveal a definition of “reactive derivatives” of carboxylic acids. The examiner does not agree that the skilled artisan would understand the limitation; there are many, possibly limitless, modifications of carboxylic acids which could be considered reactive. Neither the claims nor the specification defines which modifications are intended to be encompassed by the claims.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nobuo et al. (JP 2002-003478, January 9, 2002, machine translation) and Swatloski et al. (WO 03/029329, April 10, 2003, PTO-1449 submitted February 2, 2006).

Nobuo et al. teach a method of modifying sugars and polysaccharides using an ionic liquid in combination with water sensitive reagents such as acid halides and acid anhydrides [0031]. Ionic liquids solubilize macromolecules and biopolymers [0001] and are known in the art; for example, ionic liquids comprising N-dialkyl imidazolium ion [0003].

Nobuo et al. do not teach the use of microwave irradiation and do not teach modifications of starch in particular.

Swatloski et al. teach the dissolution of cellulose in ionic liquids using a microwave heating [page 19, first full paragraph]. Ionic liquids comprising chloride anions and imidazolium cations were most effective [page 29, last two paragraphs]. Exemplary ionic liquid cations, molten at a temperature of less than about 150°C [pages 10 and 11], include the cations shown in claims 5 and 6 of the instant application. Cellulose can be dissolved for derivatization [page 18, last sentence] and regenerated

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in a number of forms from the solution by mixing with water, ethanol, or acetone [page 28, first full paragraph].

Swatloski et al. do not teach esterification and do not teach derivatization of starch.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to esterify starch using the ionic liquids taught by Swatloski et al. and water sensitive reagents such as acid halides and acid anhydrides, as taught by Nobuo et al. Derivatization of polysaccharides using acid halides or acid anhydrides in ionic liquids is known in the art, as taught by Nobuo et al. The skilled artisan could have used the guidance provided by Swatloski et al. to optimize specific conditions for esterification of starch because starch and cellulose are both glucose polymers and thus esterification would be expected to proceed similarly on either. Neither Nobuo et al. nor Swatloski et al. teach the use of pressure for solubilization or derivatization of polysaccharides, but the skilled artisan would understand that solubility, an integral part of the teachings of Nobuo et al. and Swatloski et al., increases with pressure. Furthermore, pressure is an experimental parameter easily manipulated by the skilled artisan in chemical syntheses.

### ***Response to Arguments***

Applicant argues that starch is different in size and structure from cyclodextrin, agarose, and cellulose, and that the skilled artisan would not have expected success in dissolving starch. Nobuo et al. teach that the ionic solution is designed to dissolve synthetic macromolecules and polysaccharides, including "giant" molecules and

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polysaccharides [0017]. Agarose and cellulose, both polysaccharides, are taught in the two cited references. Based on these teachings, the skilled artisan would have had a reasonable expectation of success. "Obviousness does not require absolute predictability of success." *Id.* at 903,7 USPQ2d at 1681.

Applicant's arguments regarding the Swatloski reference are unclear. On pages 15 and 16 of the response submitted April 15, 2008, Applicant refers to Swatloski's teachings on the solubility of starches but does not indicate where in the reference these teachings are found. The examiner was unable to locate the recited teachings in the Swatloski reference. In the third paragraph on page 15 of the response submitted April 15, 2008, Applicant states that Swatloski teaches a homogeneous reaction phase; in the first full paragraph on page 16 of the response submitted April 15, 2008, Applicant argues that Swatloski teaches a heterogeneous reaction mixture, including the use of colloidal silica in every example. In Example 1 of the Swatloski reference, cellulose is dissolved in an ionic liquid medium, using microwaves, to obtain a viscous, optically clear solution. Colloidal silica is not mentioned. In the second full paragraph of page 16 of the response submitted April 15, 2008, Applicant states that Swatloski unambiguously teaches that esterifications should be conducted above 120°C, (claim 7). Claim 7 of the Swatloski reference is drawn to types of cellulose. Based on all these irregularities, it seems possible that Applicant's arguments might have been based on a different reference than the one cited. The cited reference is: Swatloski et al. WO 03/029329.

Applicant argues that the present invention does not require the use of microwaves. Swatloski teaches the benefits of using microwaves but does not require it. Nobuo also does not use microwaves. Furthermore, the instant claims do not exclude the use of microwaves; in fact, claim 2 requires the use of microwaves.

For these reasons, Applicant's arguments are not persuasive.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAYLA BLAND whose telephone number is (571)272-9572. The examiner can normally be reached on Tuesday-Friday 8:00-5:00.



If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anna Jiang can be reached on (571) 272-0627. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Shaojia Anna Jiang, Ph.D./  
Supervisory Patent Examiner, Art Unit 1623

/Layla Bland/  
Examiner, Art Unit 1623